

# *Liochlaena subulata* (A. Evans) Schljakov (Jungermanniaceae, Marchantiophyta): an addition to the hepatic flora of eastern Himalaya

Vinay Sahu and A. K. Asthana

National Botanical Research Institute, Rana Pratap Marg, Lucknow-226001, India  
E-mail: sahuvinay28@rediffmail.com; drakasthana@rediffmail.com

## ABSTRACT

Sahu V. & Asthana A. K. 2013. *Liochlaena subulata* (A. Evans) Schljakov (Jungermanniaceae, Marchantiophyta): an addition to the hepatic flora of eastern Himalaya. Geophytology 42(2): 135-138.

*Liochlaena subulata* (A. Evans) Schljakov, a species with fertile plants, is reported from Singalila National Park (Darjeeling) which is new to eastern Himalaya. Earlier, it was known from western Himalaya and South India. It belongs to family Jungermanniaceae and characteristically possesses flagelliform and gemmiparous shoots developing near stem apex, bearing apical cluster of 1 celled gemmae.

**Key-words:** *Liochlaena subulata*, Jungermanniaceae, gemmiparous shoot, gemmae, Eastern Himalaya.

## INTRODUCTION

Amakawa (1960) proposed 4 subgenera, *Plectocolea*, *Solenostoma*, *Luridae* and *Jungermannia*, under genus *Jungermannia*, which are closely related and sometimes difficult to differentiate without female inflorescence. As far as the study on Indian *Jungermannia* is concerned, only few workers (Kashyap 1932, Hattori 1966, Udar & Kumar 1981, 1983, Srivastava & Singh 1986a, b, 1988, 1995, Srivastava & Amakawa 1991, Srivastava et al. 2003, Singh & Nath 2007, Singh & Singh 2007, 2009, Srivastava 2008) have paid attention to this genus.

In a recent contribution, Singh and Singh (2007) listed 41 Indian species under four subgenera, viz. *Jungermannia* L. and *Liochlaena* Nees (with single species each), *Plectocolea* (Mitt.) Amak. (with 11 species) and *Solenostoma* (Mitt.) Amak. (with 28 taxa).

During the present investigation, plants corresponding to *Jungermannia subulata* A. Evans have been identified from Sirikhola (Darjeeling, W. Bengal), part of Singalila National Park (S.N.P.). This species was earlier reported from western Himalaya

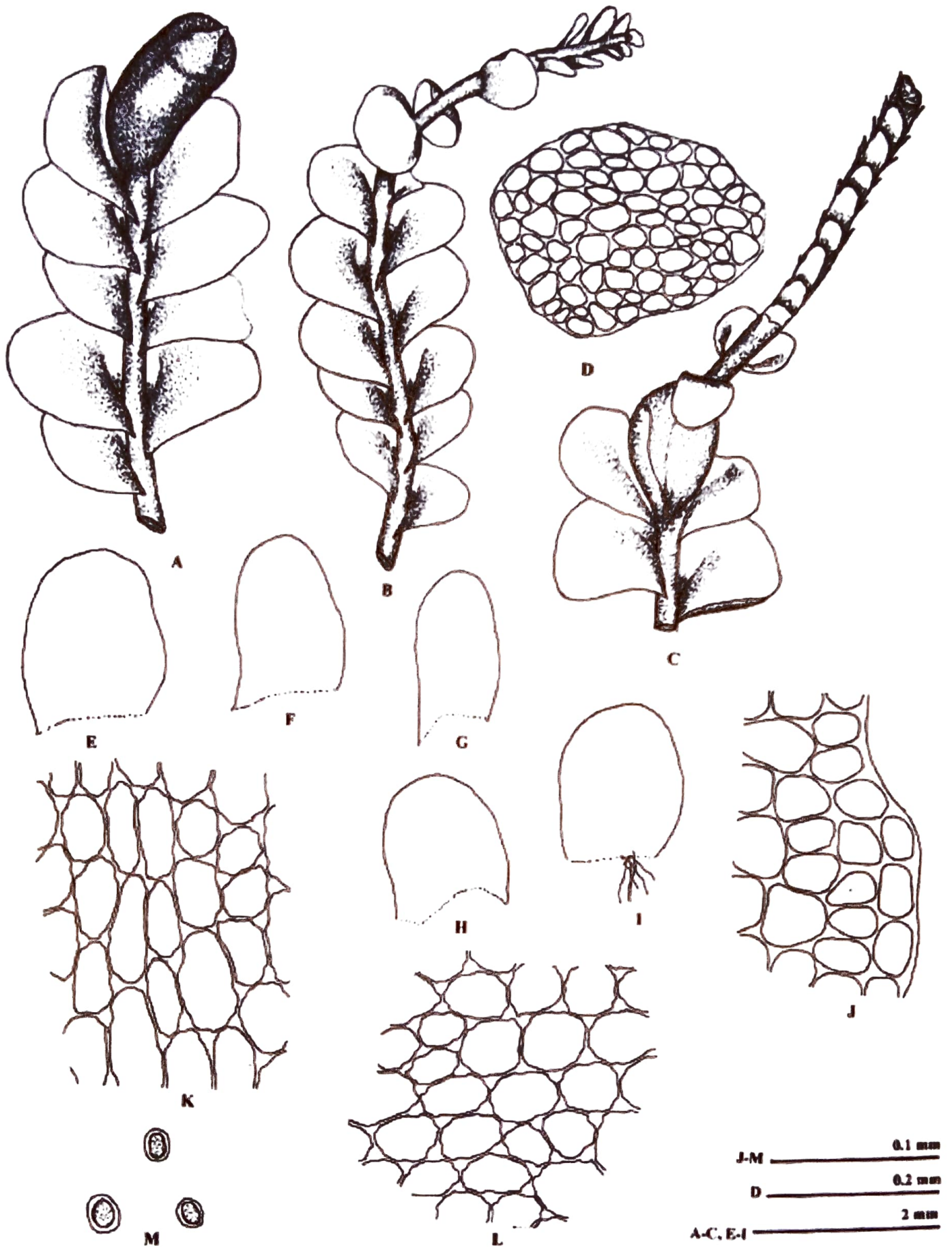
and South India by Tewari and Pant (1994), Bapna and Kachroo (2004) and Srivastava (2008). Váňa and Long (2009), in a comprehensive treatment to the Jungermanniaceae of Sino-Himalayan region, assigned three genera *Jungermannia* L. s.str., *Liochlaena* Nees and *Solenostoma* Mitt. (including *Plectocolea*) to the species of *Jungermannia* L. described earlier. According to their treatment *J. subulata* has been synonymised under *Liochlaena subulata* (A. Evans) Schljakov. Hence current status of *Jungermannia subulata* is *Liochlaena subulata* which is reported here from S.N.P. for the first time and is a new addition to east Himalayan bryoflora.

## TAXONOMIC DESCRIPTION

*Liochlaena subulata* (A. Evans) Schljakov in J. Váňa & D.G. Long, Nova Hedwigia 89(3-4): 485-517. 2009.

Text-figures 1A-M

**Synonyms:** *Jungermannia subulata* A. Evans; *Jungermannia breviperiantha* C. Gao et X. L. Bai., syn. nov.



**Text-figure 1.** A-M. *Liochlaena subulata* (A. Evans) Schljakov. A. Female plant with perianth. B, C. Plants with flagelliform and gemmiparous apex, respectively. D. Cross section of stem. E-I. Leaf lobes. J. Marginal cells of leaf. K. Basal cells of leaf. L. Median cells of leaf. M. Gemmae.

Table 1. Showing comparative and distinguishing features of *Liochlaena lanceolata* Nees and *Liochlaena subulata* (A. Evans) Schljakov

| <i>Liochlaena lanceolata</i> Nees   | <i>Liochlaena subulata</i> (A. Evans) Schljakov  |
|---|--|
| Dioecious   | Dioecious  |
| Brownish green  | Olive Green  |
| Plants 16-27 mm long and 1.39 -2.06 mm wide   | Plants 8-22 mm long and 2-3 mm wide  |
| Stem 9-11 celled across   | Stem 9-10 celled across  |
| Leaves loosely- closely imbricate, oblong rectangulate to ovate-oblong, 0.9-1.2 mm long and 0.9-1.2 mm wide   | Leaves closely imbricate, ovate to oblong rectangulate, 1.5-2 mm long and 1.12-1.5 wide                                      |
| Leaf marginal cells 16.6-23.3 x 16.6-26.6 µm; median cells 16.6-29.9 x 13.3-23.3 µm; basal cells 23.3-36.6 x 16.6-23.3 µm, trigones tri-radiate to sub-nodulose | Leaf marginal cells 20-32 x 16-24 µm; median cells 28-48 x 16-28 µm; basal cells 48-64 x 20-32 µm, trigones somewhat bulging |
| Gemmae 2 celled, ovoid elliptical   | Gemmae 1 celled oval, 12-16 µm wide  |
| Perianth cylindrical-clavate, 0.7-1.6 x 0.4-0.8 mm  | Perianth cylindrical, 2.5 x 0.8 mm   |

**Description:** Plants in dense mats, olive green or yellowish green, 8-22 mm long and 2-3 mm wide. Plants irregularly branched, creeping with erect, flagelliform and gemmiparous shoots. Stem in cross section 260 µm wide, cortical and medullary cells undifferentiated; 10 cells across the diameter, cortical cells 28-40 µm long and 20-32 µm wide, medullary cells 28-44 µm long and 20-36 µm wide, polygonal. Numerous colourless rhizoids present on the ventral surface of the stem. Leaves imbricate, widely spreading, ovate to oblong-rectangular, 1.5-2 mm long and 1.12-1.5 mm wide. Leaf marginal cells quadrate to rectangular 20-32 µm long and 16-24 µm wide, median cells 28-48 µm long and 16-28 µm wide, basal cells 48-64 µm long and 20-32 µm wide, thin walled, trigonous, trigones somewhat bulging. Gemmae, 12-16 µm wide, green, oval or rounded in shape. Dioecious, male inflorescence not seen, female inflorescence terminal, Perianth erect, cylindrical in shape, exserted, non-plicate, 2.5 mm long and 0.8 mm wide, abruptly ends into a small beak.

**Specimens examined:** India, eastern Himalaya, Darjeeling - along upper Sirikhola stream, 8.11.2003, (alt. ca. 7800 ft) leg. A. K. Asthana and V. Sahu, 225464A (LWG); western Himalaya, Mukteshwar (5 km from Ramgarh), 04.11.2008, leg. A. K. Asthana & V. Sahu, 248980C (LWG).

**Habitat:** On soil, in association with *Isopterygium* sp., *Fissidens taxifolius* Hedw. and *Orontobryum darjeelingensis* Nath et al.

**Range of distribution:** India - Himachal Pradesh, Uttarakhand, South India; Nepal, Bhutan and China.

## DISCUSSION

*Liochlaena subulata* (A. Evans) Schljakov is closely related to *Liochlaena lanceolata* Nees, however, the latter can be clearly distinguished by narrower plants (1.39-2.0 mm wide), smaller leaf cells, subnodulose trigones, 2 celled gemmae and cylindrical-clavate perianth. A comparative account of the distinguishing features of *Liochlaena subulata* and *Liochlaena lanceolata* is given in Table 1. *Solenostoma rubripunctatum* (S. Hatt.) R. M. Schust. differs from *Liochlaena subulata* in having stem 5-7 cells across, purple to colourless rhizoids, distant to contiguous leaves, slightly thick walled leaf cells and feebly developed or no trigones.

## ACKNOWLEDGEMENT

The authors are grateful to the Director, National Botanical Research Institute, Lucknow, for encouragement and for providing the facilities.

## REFERENCES

- Amakawa T. 1960. Family Jungermanniaceae of Japan. II. J. Hattori Bot. Lab. 22: 1-90.
- Bapna K. R. & Kachroo P. 2004. Hepaticology in India I. Himanshu publication, Udaipur- New Delhi.
- Hattori S., 1966. Anthocerotae and Hepaticae In: Hara H. (ed.), The flora of eastern Himalaya. Tokyo, University of Tokyo press, pp. 501-586.
- Kashyap S. R. 1932. Liverworts of the western Himalaya and the Panjab plains, Part 2- University of Panjab, Lahore.
- Singh A. P. & Nath V. 2007. Hepaticae of Khasi and Jaintia Hills: eastern Himalaya. Bishen Singh Mahendra Pal Singh, Dehra Dun, India.
- Singh S. K. & Singh D. K. 2007. *Jungermannia indrodayana* (Jungermanniaceae, Hepaticae) a new species from India. Cryptogamie, Bryologie. 28(2): 103-108.

- Singh S. K. & Singh D. K. 2009. Hepaticae and Anthocerotae of Great Himalayan National Park and its environs (H.P.), India, Botanical Survey of India, Kolkata, p 71.
- Srivastava S. C. & Singh P. 1986a. Morphotaxonomic details of *Jungermannia (Solenostoma) subrubra* Steph. Yushania 3(1): 19-23.
- Srivastava S. C. & Singh P. 1986b. *Jungermannia (Solenostoma) flagellaris* Amak. in India. Geophytology 16: 252-254.
- Srivastava S. C. & Singh P. 1988. Two species of *Jungermannia (Solenostoma)* new to Himalayas (India). Lindbergia 14: 162-166.
- Srivastava S. C. & Singh P. 1995. Some species of *Jungermannia* subgenus *Solenostoma* (Mitt.) Amak. from eastern Himalayas. In: Kumar S. S. (Ed.) Recent Studies on Indian Bryophytes, Dehradun, Bishen Singh Mahendra Pal Singh, pp. 147-155.
- Srivastava S. C., Srivastava S. & Sharma D. 2003. A new *Jungermannia (Solenostoma)* from the Valley of Flowers, India. Lindbergia 28: 129-133.
- Srivastava S. N. 2008. Some noteworthy species of the hepatics, *Jungermannia* L. from Kumaon region in western Himalaya. J. Indian Bot. Soc. 87(1-2): 37-42.
- Srivastava S. N. & Amakawa T. 1991. A new species of *Jungermannia (J. champawatensis)* from western Himalayas, India. Proc. Nat. Acad. Sci. India 61(B): 205-208.
- Tewari S. D. & Pant G. B. 1994. Bryophytes of Kumaon Himalaya. Bishen Singh Mahendra Pal Singh, Dehradun, India.
- Udar R. & Kumar A. 1981. *Jungermannia (Plectocolea) rubripunctata* (Hatt.) Amak. New to India. Miscellanea Bryologica et Lichenologica 9: 54-55.
- Udar R. & Kumar A. 1983. Studies in Indian Jungermanniaceae II. *Jungermannia (Plectocolea) tetragona* Lindenb. from Andaman Islands with a note on its distribution in India. J. Indian Bot. Soc. 62: 357-360.
- Váňa J and Long D. G. 2009. Jungermanniaceae of the Sino Himalayan region. Nova Hedwigia 89 (3-4): 485-517.